National Recovery Plan for the Forked Spyridium Spyridium species (Little Desert)

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This Recovery Plan has been developed with the involvement and cooperation of a range of stakeholders, but individual stakeholders have not necessarily committed to undertaking specific actions. The attainment of objectives and the provision of funds may be subject to budgetary and other constraints affecting the parties involved. Proposed actions may be subject to modification over the life of the plan due to changes in knowledge.

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Summary

The Forked Spyridium *Spyridium* species (Little Desert) is listed as Endangered under the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999. The species is endemic to north-western Victoria, where about 160 plants occur in three wild populations. Major threats to populations include weed invasion, habitat disturbance, lack of regeneration, road works and altered fire regimes. This national Recovery Plan for the Forked Spyridium details the species' distribution and biology, conservation status, threats, and recovery objectives and actions necessary to ensure its long-term survival.

Species Information

Description

The Forked Spyridium *Spyridium* species (Little Desert) is a small shrub growing to 1.6 m in height. Stem leaves are Y-shaped, 6–10 mm long and 1–2mm wide, dark grey-green, with scattered hairs on the upper surface, and leaf margins are slightly curved under. Clusters of small yellow flowers to 12 mm wide are surrounded by several densely hairy pale grey-green to white floral leaves. Fruit is about 2.5 mm long (description from Walsh & Entwisle 1999). The species was previously included in *Spyridium bifidum*, which has narrower, less deeply bifid leaves that are glabrous or silky pubescent above (Walsh & Entwisle 1999).

Spyridium species are obligate seed regenerators, with poor seed dispersal ability (Coates & Kirkpatrick 1999), and an inability to regenerate from rootstock (Tumino 1999). Disturbance such as fire (Coates 1996) or light soil scraping may germinate soil-stored seed, with some seedling recruitment evident after roadworks during 1999 at the Cooack Settlement Rd site (Tumino 1999). Most individuals at all sites are mature non-senescent plants, although some young plants were observed during surveys in 2002 (O. Carter & J. Downe pers. obs).

Attempts to translocate Forked Spyridium plants grown from cuttings have been unsuccessful (Tumino 1999). There may be a better success rate if high numbers of young plants are transplanted during cooler, wetter autumn months, and where there is more dedicated maintenance after planting (Tumino 1999). Improved methods for propagation and cultivation of this species need to be investigated.

Distribution

The Forked Spyridium is endemic to north-western Victoria, where it occurs near the southern boundary of the Little Desert, between Goroke and Dimboola (Walsh & Entwisle 1999), in the Murray Darling Depression IBRA Bioregion (DEH 2000). The three populations occur over a total range of only 2 km.



Figure 1. Former and current distribution of Spyridium species (Little Desert) in Victoria

Maps showing the detailed distribution of the Forked Spyridium are available from the Department of Sustainability and Environment Flora Information System (DSE-FIS). The FIS is

a state-wide repository for flora grid and site distribution data, photographs and text descriptions. This information is available on request in a variety of formats for natural resource management purposes.

Population Information

Only three populations of Forked Spyridium are known, occurring in the following locations:

- Roadside, Cooack Fire Access Rd: 9 plants.
- Roadside, Cooack Settlement Rd: 120 plants.
- Cooack (private property): 35 plants.

Habitat

The Forked Spyridium occurs in mallee heathlands and heathy woodlands, on windblownderived sandy soils, in low rainfall areas (Tumino 1999). Upper strata include *Eucalyptus arenacea*, *Eucalyptus incrassata*, *Callitris rhomboidea* andr *Allocasuarina muelleriana*, and heathy and narrow-leaved shrubs include *Astroloma conostephoides*, *Brachyloma daphnoides*, *Callitrix alpestris*, *Callitrix tetragona*, *Hibbertia sericea*, *Leoucopogon ericoides*, *Leptospermum myrsonoides*, *Phebalium stenophylla* and *Persoonia juniperina* in the lower strata. Recovery actions include survey and mapping of habitat that will lead to the identification of habitat critical to the survival of the species.

Threats

The Forked Spyridium was almost certainly more widespread and abundant within the region where it currently occurs, but populations have most likely been fragmented and depleted historically by land clearance for settlement and agriculture. This species does not occur in any protected conservation reserves. Given the extremely limited distribution and very low numbers of plants, the risk from stochastic events is probably high. An absence of appropriate germination cues, such as fire, may lead to a decline in abundance in future years as existing plants senesce. Poor seed dispersal, coupled with the fragmented nature of current habitat on insecure tenure, means that this species is at very high risk of extinction. The main threats to the species are summarised as follows:

Weed invasion: Sites where the Forked Spyridium occurs are largely indigenous vegetation, although there are some weeds present, including Smooth Cat's-ear *Hypochaeris glabra* and Perennial Veldt-grass *Ehrharta calycina*.

Habitat clearing and disturbance: Harvesting of Broombrush *Melaleuca uncinata* occurs near the Forked Spyridium sites. The current Broombush cutter is aware of the location and identification of this plant and avoids the sites to prevent any damage (Tumino 1999), but a change in operators may threaten survival of roadside populations. The private land site is within a fenced patch of relatively intact native vegetation, but future clearing or grazing the land with domestic stock, especially goats, could destroy those plants. Land clearance is listed as a Key Threatening Process under the Commonwealth EPBC Act.

Roadworks: With two of the three known populations occurring on roadsides, any widening, clearing of roadside vegetation or other maintenance or vehicle and machinery movement may damage or destroy plants. Both roadside sites are signposted as Native Plant Reserves to avoid inadvertent damage.

Inappropriate fire regimes: The response of Forked Spyridium to fire is unknown, however other *Spyridium* species germinate at temperatures expected during fire (Coates 1996). The absence of fire may reduce or eliminate germination altogether, with the populations aging and dying out. Controlled or 'cool' burning may also be a risk as fire temperatures are not high enough to stimulate seed germination, but still may kill existing plants.

Trampling: Apiarists have set up numerous beehives along the roadside near the Forked Spyridium populations, and trampling of seedlings could occur during honey collection, while walking from the road to those hives.

Recovery Information

Overall Objective

The **overall objective** of recovery is to minimise the probability of extinction of the Forked Spyridium in the wild and to increase the probability of important populations becoming self-sustaining in the long term.

Within the life span of this Recovery Plan, the **specific objectives** of recovery of the Forked Spyridium are to:

- Acquire accurate information for conservation status assessments.
- Identify habitat that is critical, common or potential.
- Ensure that all populations and their habitat are protected and managed appropriately.
- Manage threats to populations.
- Identify key biological functions
- Determine the growth rates and viability of populations.
- Establish populations in cultivation.
- Build community support for conservation.

Program Implementation

The Recovery Plan will run for five years from the time of implementation and will be managed by the Department of Sustainability and Environment. A Threatened Flora Recovery Team, consisting of scientists, land managers and field naturalists will be established to oversee threatened flora recovery in Victoria in general. Technical, scientific, habitat management or education components of the Recovery Plan will be referred to specialist sub-committees on research, *in situ* management, community education and cultivation. Regional Recovery Teams will be responsible for preparing work plans and monitoring progress toward recovery.

Program Evaluation

The Recovery Team will be responsible for annual assessments of progress towards recovery. This Recovery Plan will be reviewed within five years of the date of adoption.

Recovery Actions and Performance Criteria

Action	Description	Performance Criteria					
Specific objective 1							
Acquire accurate information for conservation status assessments							
1.1	Clarify the taxonomy of populations to enable an accurate conservation status assessment.	Updated records on all State databases.					
	Responsibility: Adelaide Herbarium						
Specific objective 2							
Identify	habitat that is critical, common or potential						
2.1	Accurately survey known habitat and collect floristic and environmental information describing community ecology and condition.	 Completion of requirements for essential life history stages, recruitment and dispersal identified at known sites. 					
	Responsibility: DSE	Habitat critical to the survival of the species is mapped.					
2.2	Identify and survey potential habitat, using ecological, historical and anecdotal information indicating habitat preference.	• Sites of potential habitat identified and surveyed.					
	Responsibility: DSE						
Specific objective 3							
Ensure	that all populations and their habitat are legally protected						
3.1 3.2	Negotiate Public Authority Management Agreements under the <i>FFG Act</i> 1988 or establish roadside conservation reserves and protect with Victorian Planning Provisions	• Establish a public land protected area network for threatened taxa Cooack Fire Access Rd and Cooack Settlement Rd sites.					
	Responsibility: DSE, Hindmarsh Shire Council	Amend Hindmarsh Shire's existing 'Vegetation Protection Overlay' to incorporate <i>Spyridium</i> sp. 1 in the planning schemes.					
	Initiate private land management agreements in consultation with private land owners under the <i>Victorian Conservation Trust Act</i> 1972, <i>The Conservation, Forests and Lands Act</i> 1987 and the <i>Wildlife Act</i> 1975 at Cooack private property site.	• Establish a private land protected area network for threatened taxa at Cooack private property site.					
	Responsibility: DSE						

Action	Description	Performance Criteria				
Specific	objective 4					
Manage	threats to populations					
4.1	Identify disturbance regimes to maintain habitat.	 Preparation 	of management prescriptions for ecological burning			
	Responsibility: DSE	or soil scrap Cooack Set	or soil scraping within sections of Cooack Fire Access Rd and Cooack Settlement Rd sites.			
4.2	Control threats by installing appropriate signage, preventing access, hand weeding and fencing sites.	 Measurable Cooack Set 	e seedling recruitment at Cooack Fire Access Rd and ttlement Rd sites.			
	Responsibility: DSE/Hindmarsh Shire Council	• A measurable reduction in plant mortality at Cooack Fire A Rd and Cooack Settlement Rd sites.				
Specific objective 5						
Identify	key biological functions					
5.1	Evaluate current reproductive/regenerative status to determine seed bank status and longevity, fecundity and recruitment levels.	 Seed bank/ populations 	regenerative potential quantified for targeted			
	Responsibility: DSE					
5.2	Determine seed germination requirements by conducting laboratory and field trials aimed to identify key stimuli.	Stimuli for r	ecruitment identified.			
	Responsibility: DSE	 Manageme restore proc 	nt strategies identified to maintain, enhance or cesses fundamental to reproduction and survival.			
Specific	objective 6					
Determi	ne the growth rates and viability of populations					
6.1	Measure population trends and responses against recovery actions by collecting		for monitoring developed and implemented.			
	demographic information including recruitment and mortality, timing of life history stages and morphological data.	Collection c	of census data.			
	Responsibility: DSE					
6.2	Collate, analyse and report on census data and compare with management histories.	Population	growth rates determined and Population Viability			
	Responsibility: DSE	Analysis co	mpleted for targeted populations.			

Action	Description	Performance Criteria					
Specific	Specific objective 7						
Establish populations in cultivation / Establish seed bank							
7.1	• stablish cultivated plants <i>ex situ</i> for inclusion in living collections to safeguard • gainst any unforeseen destruction of wild populations.		Development of effective propagation and cultivation techniques.				
	Responsibility: RBG/GBG/Contractor/Other	•					
7.2	Establish a seed bank and determine seed viability.	•	Seed from important populations in long term storage.				
	Responsibility: RBG/GBG/Other	•	Long-term storage facility identified.				
Specific objective 8							
Build co	mmunity support for conservation						
8.1	Identify opportunities for community involvement in the conservation of <i>Spyridium</i> sp. 1.	•	Presentation(s) to community nature conservation groups.				
	Responsibility: DSE						

Abbreviations

DSE Department of Sustainability and Environment, Victoria

GBG Geelong Botanic Gardens

RBG Royal Botanic Gardens, Melbourne

Management Practices

The philosophy of the strategy for recovery is habitat conservation, restoration and management combined with an understanding of the ecological and biological requirements of Forked Spyridium. The emphasis is on using knowledge to better implement *in situ* management techniques that protect populations and promote regeneration and recruitment. To achieve this, recovery actions are primarily structured to (i) acquire baseline data, (ii) assess habitat condition including ecological and biological function, (iii) protect populations to maintain or improve population growth and (iv) to engage the community in recovery actions.

On-ground site management will aim to mitigate threatening processes and thereby ensure against extinction. Major threats requiring management include accidental destruction, competition from pest plants, inappropriate fire regimes and grazing by pest animals. A range of strategies will be necessary to alleviate these threats including weed control, fire management, fencing, and control of pest animals.

Broadscale protection measures applicable to all populations include legal protection of sites, habitat retention and liaison with land managers including private landholders. In addition, searches of known and potential habitat should continue to better define the distributions and size of populations.

The Recovery Plan also advocates strategies to fill some of the major gaps in our knowledge to date. These include an understanding of the mechanisms underlying recruitment and regeneration. Successful *in situ* population management will be founded on understanding the relationships between Forked Spyridium and associated flora, and its response to environmental processes. These are directly linked to biological function and are thus vital to recovery. Demographic censusing will be necessary to gather life history information and to monitor the success of particular management actions.

In addition to the above, *ex situ* conservation measures will be required and will include seed storage and plant cultivation. Cultivating *ex situ* populations will also aim to increase the amount of seed available for reintroduction to sites.

Community participation in recovery actions will be sought, particularly in regard to recovery team membership and implementation of on-ground works.

To reduce the likelihood of unforseen development activities negatively impacting upon Forked Spyridium, the threatened flora team should seek relevant information on its distribution, ecology and/or habitat to relevant land managers. Such increased awareness should allow new populations to be found if they exist, and improve the likelihood of adequate searches being made during environmental impact assessments.

Affected Interests

Two populations of Forked Spyridium occur on roadsides that fall under the jurisdiction of the Hindmarsh Shire Council, which has approved the relevant actions within this Recovery Plan subject to availability of adequate funding. One population occurs on private land, and during implementation the landholder will be contacted and any protection measures required will be achieved through negotiation with the landholder.

Role and interests of indigenous people

Indigenous communities on whose traditional lands Forked Spyridium occurs will be advised, through the relevant DSE Regional Indigenous Facilitator, of the preparation of this Recovery Plan and invited to provide comments if so desired. Indigenous communities will be invited to be involved in the implementation of the Recovery Plan.

Benefits to other species/ecological communities

The Recovery Plan includes a number of potential biodiversity benefits for other species and vegetation communities in Victoria. Principally, this will be through the protection and management of habitat. The adoption of broad-scale management techniques and collection of baseline data will also benefit a number of other plant species growing in association with Forked Spyridium, particularly those species with similar life forms and/or flowering responses.

The Recovery Plan will also provide an important public education role as threatened flora have the potential to act as 'flagship species' for highlighting broader nature conservation and biodiversity issues such as land clearing, grazing, weed invasions and habitat degradation.

Social and economic impacts

The implementation of this Recovery Plan is unlikely to cause significant adverse social and economic impacts. Two populations occur on roadsides on minor rural roads managed the Hindmarsh Shire Council, and protection measures there will have negligible impact on any current recreational or commercial activities in the area. Any protection measures required for the population on private land will be achieved through negotiation with and assistance to the landholder.

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Bibliography

- Coates, F. 1991. *The Conservation Ecology and Management of Five Rare Species in the Rhamnaceae Family*. Wildlife Scientific Report 91/3. Department of Parks, Wildlife and Heritage, Tasmania.
- Coates, F. 1996. *Ecological and biogeographical correlates of rarity in two narrow endemics in Tasmania:* <u>Spyridium microphyllum</u> *and* <u>Spyridium obcordatum</u>. Ph.D. Thesis, University of Tasmania.
- Coates, F. and Kirkpatrick, J.B. 1999. Is geographic range correlated with climatic range in Australian *Spryridium* taxa? *Australian Journal of Botany* 47: 755–767.
- DEH 2000. Revision of the Interim Biogeographic Regionalisation of Australia (IBRA) and the Development of Version 5.1. - Summary Report. Department of the Environment and Heritage, Canberra.
- Tumino, M. 1999. *Forked Spyridium* Spyridium species 1: *Flora and Fauna Guarantee Action Statement*. Final Draft Report, Department of Natural Resources and Environment, Melbourne.
- Walsh, N.G. 2000. *Spyridium* species nov. Little Desert: NRE Threatened Flora IUCN Assessment Data Sheet, unpublished document.
- Walsh, N.G. and Entwisle, T.J. 1999. *Flora of Victoria, Vol 4: Dicotyledons: Cornaceae to Asteraceae*. Inkata Press, Melbourne.

Priority, Feasibility and Estimated Costs of Recovery Actions

Action	Description	Priority	Feasibility	Responsibility	Cost estimate					
					Year 1	Year 2	Year 3	Year 4	Year 5	Total
1	Conservation status		_							
1.1	Clarify taxonomy	2	100%	Adelaide Herb.	\$2000	\$0	\$0	\$0	\$0	\$2,000
2	Habitat requirements									
2.1	Survey known habitat	2	100%	DSE	\$10,000	\$0	\$0	\$0	\$0	\$10,000
2.2	Identify and survey potential habitat	1	75%	DSE	\$20,000	\$0	\$0	\$0	\$0	\$20,000
3	Legal protection of habitat									
3.1	Protect public land habitat	1	75%	DSE	\$0	\$20,000	\$10,000	\$0	\$0	\$30,000
3.2	Protect private land habitat	1	50%	DSE	\$0	\$10,000	\$0	\$0	\$0	\$10,000
4	Manage threats		_							
4.1	Identify disturbance regimes	1	75%	DSE	\$10,000	\$10,000	\$0	\$0	\$0	\$20,000
4.2	Control threats	2	75%	DSE/Hindmarsh S	\$20,000	\$20,000	\$5,000	\$0	\$0	\$45,000
5	Identify key biological functions		_				_			
5.1	Evaluate reproductive status	1	75%	DSE	\$0	\$12,000	\$12,000	\$0	\$0	\$24,000
5.2	Seed germination	1	75%	DSE	\$0	\$10,000	\$10,000	\$0	\$0	\$20,000
6	Growth rates, pop. viability		_							
6.1	Conduct censusing	2	100%	DSE	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000	\$75,000
6.2	Collate, analyse and report	2	100%	DSE	\$0	\$0	\$0	\$0	\$5,000	\$5,000
7	Establish pops. in cultivation		_							
7.1	Establish cultivated plants	2	50%	RBG/GBG/Other	\$0	\$0	\$15,000	\$15,000	\$15,000	\$45,000
7.2	Establish a seed bank	2	50%	RBG/GBG/Other	\$0	\$0	\$4,000	\$4,000	\$4,000	\$12,000
8	Education and communication									
8.1	Community extension	2	100%	DSE	\$6,000	\$6,000	\$6,000	\$6,000	\$6,000	\$30,000
	TOTALS				\$83,000	\$103,000	\$77,000	\$40,000	\$45,000	\$348,000